

**MA 321 Probability Theory (1)**

An introduction to probability theory, conditional probability, Bayes' formula, random variables, expected value, variance, discrete and continuous probability distributions.

Prerequisite: MA 310.

**MA 335 Transition to Higher Mathematics (1)**

An introduction to the logic and methods used in advanced mathematics, with emphasis on understanding and constructing proofs. Prerequisite: MA 232. Spring.

**MA 422 Mathematical Statistics (1)**

An investigation of selected topics in statistics from a theoretical viewpoint. Topics may include sampling distributions, point estimation, interval estimation, hypothesis testing, regression and correlation, analysis of variance, and nonparametric methods. Prerequisite: MA 321.

**MA 441 Mathematical Finance (1)**

An introduction to the mathematical theory of finance, aimed at mathematics students and quantitatively oriented business and economics students. Topics may include arbitrage, binomial trees, futures, interest rates, and options. Prerequisite: MA 310.

**MA 451 Abstract Algebra (1)**

Topics include binary operations, groups, subgroups, group homomorphisms, factor groups, and a brief introduction to rings and fields. Prerequisite: MA 335.

**MA 454 Numerical Analysis (1)**

An introduction to numerical methods of solution and their analysis. Topics include computer arithmetic, propagation of error, systems of linear and non-linear equations, numerical integration, curve fitting, and differential equations. Prerequisite: MA 310.

**MA 455 Introduction to Topology (1)**

An introduction to the topology of Euclidean space and/or surfaces. Topics include continuity, compactness, cell complexes, and the classification of surfaces. Applications include fixed-point theorems, the Jordan curve theorem, and map colorings.

Prerequisites: MA 310 and MA 335.

**MA 458 Introduction to Complex Analysis (1)**

Complex numbers, analytic functions, Cauchy-Riemann equations, curves and integrals, Cauchy's Theorem and applications, Taylor and Laurent series, analytic continuation, Residue Theorem, harmonic functions, and conformal mappings. Prerequisites: MA 310 and MA 335.

**MA 461 Real Analysis (1)**

A rigorous treatment of sequences, limits, continuity, differentiation, infinite series, sequences and series of functions, uniform convergence and its implications for function series. Prerequisites: MA 310 and MA 335.